CLAIMS

1. (Original) A gas sensor, comprising:

a first electrode and a reference electrode with an electrolyte disposed therebetween, wherein the first electrode and the reference electrode are in ionic communication, wherein the reference electrode has a surface on a side of the reference electrode opposite the electrolyte and the surface has a surface area; and

a reference gas channel in fluid communication with the reference electrode, wherein at least a portion of the surface of the reference electrode physically contacts at least a portion of the reference gas channel, and wherein the portion of the reference electrode in physical contact with the reference gas channel is less than about 90% of the surface area.

2. (Original) A gas sensor as in Claim 1, wherein the portion of the reference electrode in physical contact with the reference gas channel is less than about 75% of the surface area.

3. (Original) A gas sensor as in Claim 2, wherein the portion of the reference electrode in physical contact with the reference gas channel is less than about 50% of the surface area.

4. (Cancelled)

5. (Previously Presented) A gas sensor as in Claim 27, wherein the portion of the reference electrode in physical contact with the reference gas channel is less than about 15% of the surface area.

6. (Original) A gas sensor as in Claim 1, further comprising a heater disposed in thermal communication with the reference electrode.

7. (Original) A gas sensor as in Claim 1, wherein the gas sensor has an impedance below about 4,000 Ω.

8. (Original) A gas sensor as in Claim 7, wherein the gas sensor has an impedance below about 3,500 Ω.

9. (Previously Presented) A gas sensor as in Claim 8, wherein the gas sensor has an impedance below about 3,400 Ω.

10. (Original) A gas sensor as in Claim 1, wherein a first electrode size is different than a reference electrode size.

11. (Original) A gas sensor as in Claim 10, wherein the first electrode size is smaller than the reference electrode size.

12. (Original) A method for forming a gas sensor, comprising:

disposing an outer electrode and a reference electrode on opposite sides of an electrolyte such that the outer electrode and the reference electrode are in ionic communication, wherein the reference electrode has a surface on a side of the reference electrode opposite the electrolyte;

disposing at least a portion of a fugitive material in physical contact with a portion of the reference electrode surface, wherein the reference electrode has a surface area and the portion of the reference electrode surface in physical contact with the fugitive material is less than about 90% of the surface area;

disposing a heater on a side of the fugitive material opposite the reference electrode to form a green sensor; and

co-firing the green sensor.

13. (Original) A method for forming a gas sensor as in Claim 12, wherein the portion of the reference electrode surface in physical contact with the fugitive material is less than about 75% of the surface area.

14. (Original) A method for forming a gas sensor as in Claim 13, wherein the portion of the reference electrode surface in physical contact with the fugitive material is less than about 50% of the surface area.

15. (Original) A method for forming a gas sensor as in Claim 14, wherein the portion of the reference electrode surface in physical contact with the fugitive material is less than about 25% of the surface area.

16. (Original) A method for forming a gas sensor as in Claim 15, wherein the portion of the reference electrode surface in physical contact with the fugitive material is less than about 15% of the surface area.

17. (Original) A method for forming a gas sensor as in Claim 12, wherein the gas sensor has an impedance below about 4,000 Ω.

18. (Original) A method for forming a gas sensor as in Claim 17, wherein the gas sensor has an impedance below about 3,500 Ω.

19. (Original) A method for forming a gas sensor as in Claim 18, wherein the gas sensor has an impedance below about 3,400 Ω or less.

20. (Original) A method for forming a gas sensor as in Claim 12, wherein the first electrode and the reference electrode are of different sizes.

21. (Currently Amended) A gas sensor, comprising:

a first electrode and a reference electrode with an electrolyte disposed therebetween, wherein the first electrode and the reference electrode are in ionic communication, wherein the reference electrode has a surface on a side of the reference electrode opposite the electrolyte and the surface has a surface area, and wherein the reference electrode having a reference electrode width and is in contact with an insulating layer having an insulating layer width, wherein the reference electrode width is about 60% to about 85% of the insulating layer width; and

a reference gas channel in fluid communication with the reference electrode, wherein at least a portion of the surface physically contacts at least a portion of the reference gas channel, and wherein the portion of the reference electrode in physical contact with the reference gas channel is less than about 90% of the surface area.~~.~~

22. (Currently Amended) A gas sensor as in Claim 21, wherein the portion of the reference electrode ~~surface~~ in physical contact with the reference gas channel is less than about 25% of the surface area.

23. (Previously Presented) A gas sensor as in Claim 21, wherein the gas sensor has an impedance below about 4,000 Ω.

24. (Previously Presented) A gas sensor as in Claim 21, wherein the reference electrode width is 70% to about 80% of the insulating layer width.

25. (Previously Presented) A gas sensor as in Claim 21, wherein a first electrode size is different than a reference electrode size.

26. (Previously Presented) A gas sensor as in Claim 24, wherein the first electrode size is smaller than the reference electrode size.

27. (Previously Presented) A gas sensor, comprising:

a first electrode and a reference electrode with an electrolyte disposed therebetween, wherein the first electrode and the reference electrode are in ionic communication, wherein the reference electrode has a surface on a side of the reference electrode opposite the electrolyte and the surface has a surface area; and

a reference gas channel in fluid communication with the reference electrode, wherein at least a portion of the surface of the reference electrode physically contacts at least a portion of the reference gas channel, and wherein the portion of the reference electrode in physical contact with the reference gas channel is less than about 25% of the surface area.